NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION

LET-DOWN FENCING, WATER GAPS, CATTLE GUARDS, AND OTHER FENCE COMPONENTS

CODE 382(h)

I. SCOPE

The work shall consist of furnishing materials and installing fence components at the location(s) shown on the plan map and, if needed, on the drawings or as staked in the field.

Fencing includes brace assemblies, gates, cattle guards, and other components required to meet site conditions and achieve objectives for practice application.

II. CONSIDERATIONS

Let-down fences are designed for mountainous areas with heavy snow pack that can loosen or break fence wires and pull over fence posts.

Water gaps control livestock where fence lines cross streams or drainage ways.

Flood gates are installed in low areas of a fence line that are subject to flash flooding.

Cattle guards are metal structures constructed over an excavated pit. Gates should be constructed next to cattle guards to allow for livestock access and wildlife.

WILDLIFE CONSIDERATIONS

This fence design also offers unhindered movement to big game and is suited for use where seasonal movements of big game is to be allowed for. To accommodate passage of resident big game while the fence span is upright, the top line wire is set at no more than 40-inches and the bottom wire is set at least 18-inches above the ground line.

Although let-down fences greatly reduce fence damage due to snow or wildlife, several disadvantages of this fence design should be noted: (1) cannot protect against stray or trespass livestock when fence is down; (2) must be raised and lowered each year; and, (3) over winter contact with the ground corrodes fence wire more quickly.

II. SPECIFICATIONS

A) MATERIALS

All materials will be new, unless an exception is noted.

Where appropriate, all materials used for installation and not specifically listed below shall be in accordance with the requirements set forth for standard post-and-wire fence.

LET-DOWN FENCE

The let-down fence is basically a four-strand barbed-wire fence that can be laid on the ground during winter after the grazing season or during periods of expected big game movement, but remains under tension at all times (Exhibit 2).

With let-down fencing, line posts remain set but wood or metal stubs are used to attach line wires to each line post.

- If wood stubs are used, they must be at least 46-inches long and have a 2-inch top diameter.
- Steel stubs must be at least 46-inches long and meet the material quality specifications for steel line posts set forth for conventional post-and-wire fence.

CATTLE GUARD

Cattle guard grids shall be fabricated of the structural steel shapes shown in Exhibit 5 or other drawings approved by the State Resource Conservationist.

All structural steel shall conform to current ASTMA-7 specifications. All welds shall be secure and complete along both edges of the cross pieces and at all frame joints. All structural steel and welds shall be given at least one coat of rust proofing paint after fabrication is completed. All bolts, nuts, and washers will be galvanized.

Cattle guards fabricated using pipe rails do not meet practice specification requirements.

Commercially fabricated cattle guards are acceptable for use providing:

- Such structures are designed for, and will support, H-20 loading. H-20 loading refers to a gross vehicle weight of 20-tons based on a weight distribution of 4,000-pounds on each side of the front axles and 16,000-pounds on each side of the rear axles.
- The structures are all steel and welded construction
- The structures are of the nominal overall dimensions as shown in Exhibit 5. Powder River Model H-20 and Lincoln Steel Corporation Super Duty Autogate (both with clean-out sections), or

their equal, meet practice specification requirements.

B) CONSTRUCTION SPECIFICATIONS

Unless otherwise specified, all construction requirements for installing posts, wire, and fasteners shall be in accordance with the specifications set forth for standard post-and-wire fence.

LET-DOWN FENCE

ALIGNMENT

Let-down fence spans shall be planned and constructed as straight stretches.

FENCE HEIGHT

The intended use of the fence determines fence height and line wire spacing. The minimum height (measured from the ground at post locations) of conventional post-and-barbed wire fences shall not be less than 36-inches (Exhibit 1).

IN-LINE BRACE UNITS

In-line brace assemblies are critical to the let-down fence design as they support the span that will be let down.

- In-line fence brace assemblies shall be separated by no more than 180-feet.

Line wire strands are stretched between brace posts.

Construction will allow each section between brace units (anchor points) to be laid down (Exhibit 1).

LINE POSTS

Line posts may be wood or steel.

Line posts remain set, but wood or metal stubs are used to attach line wires to each line post (Exhibit 1).

Line wires are stapled or clipped to the stubs.

Loops of No. 9-gauge, galvanized, wire are stapled at the bottom and top of wood line posts or are attached through holes drilled in steel posts. These wire loops are used to hold stubs to the line posts during the period when fence is upright.

When a fence section is let down, each stub should remain attached to the bottom wire loop of its associated line post so animals do not become entangled in the wire (Exhibit 2).

The fence is raised by placing the upper end of the stubs in the top loops of line posts.

LINE POST SPACING is the same for all line post materials (metal, wood, etc.): Line post intervals shall be as follows:

- 3-wire fence
  - 16½-feet (1 rod) maximum line post interval.
- 4-wire fence
  - 20-foot maximum line post interval without stays.
  - 25-foot maximum line post interval when one stay is set mid-way between line posts.
  - 30-foot maximum line post spacing when two stays are set at 10-foot intervals between posts.

In heavy snow country, wooden posts should be spaced at no more than 16½-foot (1 rod) intervals to assure strength.

STAYS

When required, stays shall be evenly spaced between line posts to ensure that the proper interval between line wire strands is maintained.

FLOOD GATES AND WATER GAPS

Functional flood gates can be fabricated of one or more panels of pressure-treated boards fastened together with high-tensile wire and staples, or with wood stays and galvanized nails. The panels can be formed to fit the contour of the slope on either side of the drainageway or segmented to swing only in areas subjected to flooding.

The panels can also be suspended with loops of high-tensile wire from a horizontal cable consisting of a double wrap of high-tensile wire strung between the line posts on either side of the drainageway. These line posts should be diagonally wired to the adjacent post (Exhibit 3).

Fence lines that cross streams may be damaged during heavy runoff periods unless water and water-born debris are allowed to pass under the fence.

An engineer should be consulted to assist in planning for water gap placement and appropriate water gap design.

There are two basic types of water gaps: for areas with very little water and only occasional flooding, a breakaway fence will be sufficient. In areas with regular flooding, water gap fencing should be constructed using floating gates or panels.

For depressions less than 16-feet wide, fence across the depression with no braces. For depressions greater than 16-feet wide, construct a fence that will breakaway only in the depression and leave the reaming fence sections undamaged. On wide drainageways brace units are constructed on either side of the depression and a separate fence section is installed within the drainageway. The end posts of the breakaway section are set 6 to 12-inches from the brace posts and attached to the main fence brace units

with a light gauge wire. The light gauge tie wire will break if the fencing in the depression fails and damage to the main fence line is avoided.

Post material and dimensions, wire, and wire spacing for the water gap fence section are the same as for the main fence. Posts within the breakaway section can be set less than 12-inches deep to prevent post damage should the fence in the depression fail (Exhibits 3 and 4).

Where a fenced depression receives regular flooding, a swinging or floating panel can be installed. This panel must be free to swing as water flows through the drainageway. Cross braces are constructed downstream of the swinging panel to offer a smooth edge for debris to pass by.

Although most water gaps and flood gates are designed to be self-cleaning it is necessary to check water gaps and flood gates after heavy flooding.

CATTLE GUARDS

Cattle guards shall be installed at right angles to the roadway.

Cattle guard bases shall be of reinforced concrete.

The cattle guard base shall have provision for drainage of the pit excavated for cattle guard placement.

All concrete shall be Class A, either ready-mix or field-mix.

Reinforcing bars shall be deformed intermediate grade.

Forms shall be used wherever necessary to shape concrete to required lines. Exposed concrete edges shall have a 1-inch x 1-inch chamfer.

Poured concrete is to be protected from freezing during the first 72 hours after placement.

Backfill material shall be placed around the concrete to the finish grade. Backfill material is to be free from rock fragments larger than gravel-size and excess organic matter. Backfill is placed in layers not to exceed 6-inches in thickness and is either hand-tamped or machine compacted (Exhibit 6).

Cattle guards shall be securely bolted to their base.

Refer to Exhibit 6 for recommended cattle guard wing construction (if metal wings are not part of cattle guard structure) and for fence line connections.

OTHER FENCE COMPONENTS

Materials used will follow Nevada NRCS Standards and Specifications for the standard post-and-wire fence conservation practice as appropriate.

Installation of fence components shall follow construction specifications presented in the 1988 USDA/USDI publication Fencing unless otherwise stated above.

IV. INSTALLATION

Installation of cattle guards and other fence components shall conform to the specifications and exhibits or other drawings, as provided.

The completed job shall be workmanlike and present a good appearance. The installer and other persons will conduct all work in accordance with proper safety procedures.

V. BASIS OF ACCEPTANCE

After the fencing and all fence components have been installed, a site inspection will be made to determine if construction, and the materials used, meet practice specification requirements as specified on the conservation practice documentation worksheet.

VI. MAINTENANCE

This practice will require the performance of periodic maintenance.

Cattle guard pits must be cleaned out periodically to prevent debris from accumulating below the grates.

Check water gaps and flood gates after heavy flooding.

Fence maintenance items to be alert to and corrected include:

- broken stubs
- stub wires broken
- wire corrosion
- tension of wire
- broken line wires
- pulled staples or clips
- wildlife concerns
- bent or broken stays
- bent steel posts
- post alignment
- post stability
- sagging gates

REFERENCES

The following references provide excellent guidance for fence construction, selection of fencing materials, and the installation of fence components.

Henderson, G.E. 1966. Planning Farm Fences. American Association for Agricultural Engineering and Vocational Agriculture, Athens, GA. 54pp.

Paige, C. 2008. A Landowner's Guide to Wildlife Friendly Fences. Landowner/Wildlife Resource Program, Montana Fish, Wildlife, and Parks. Helena, MT. 44 pp.

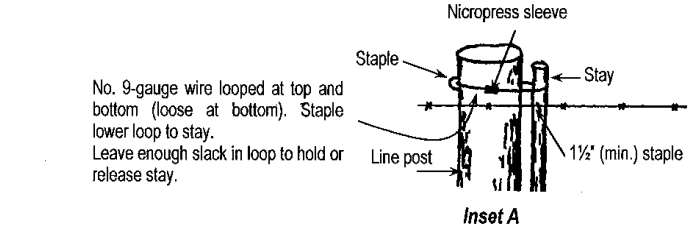
Sanderson, H.R. T.M. Quigley, E.E. Swan, L.R. Spink, 1990. Specifications for Structural Range Improvements. Gen. Tech. Rep. PNW-GTR-250. Portland, OR. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 126p.

USDI Bureau of Land Management and USDA Forest Service. 1988. Fencing. 2400-Range 8824 2803.

Valentine, J.F. 1989. Range Developments and Improvements. Academic Press, San Diego, CA.

Wyoming Game and Fish Department. 2004. Fencing Guidelines for Wildlife. Habitat Extension Bulletin No.53.

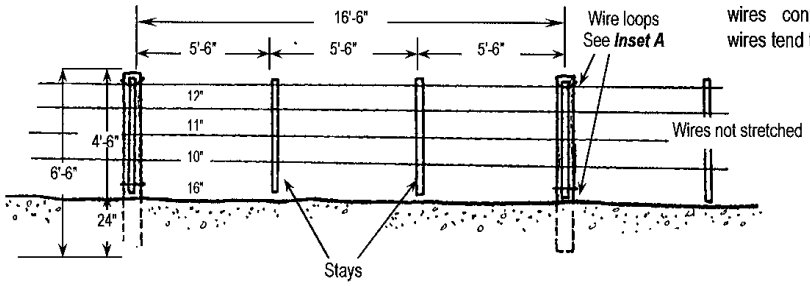
EXHIBIT 1



Inset A

STAY LET-DOWN FENCE

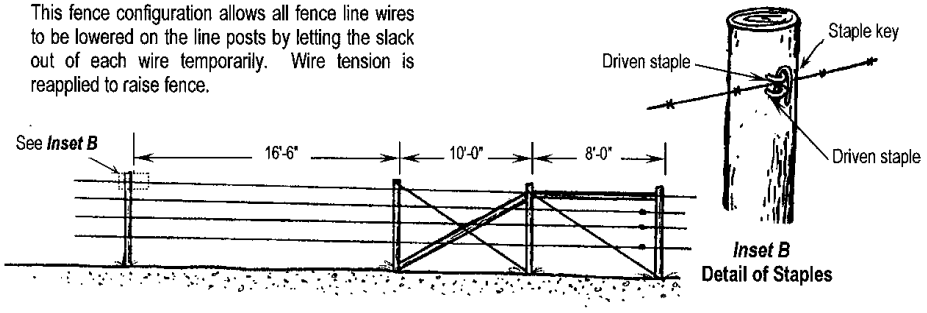
This fence configuration allows fence sections to lay on the ground. Line posts remain set. The bottom of stays are attached to the posts so animals do not become entangled. As fence wires contact the ground, wires tend to corrode quickly.



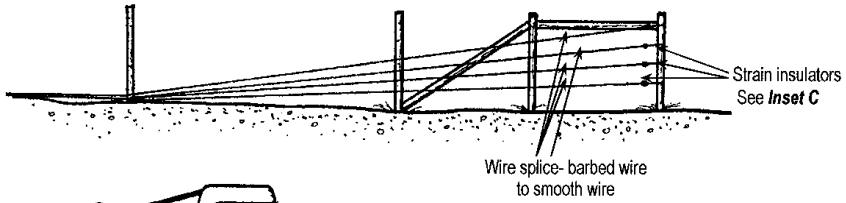
NOTE: ***Steel posts may also be used***

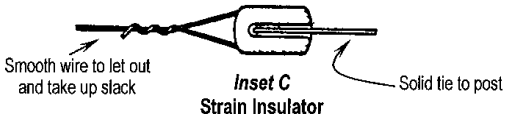
STAPLE LET-DOWN FENCE

This fence configuration allows all fence line wires to be lowered on the line posts by letting the slack out of each wire temporarily. Wire tension is reapplied to raise fence.



Inset B
Detail of Staples



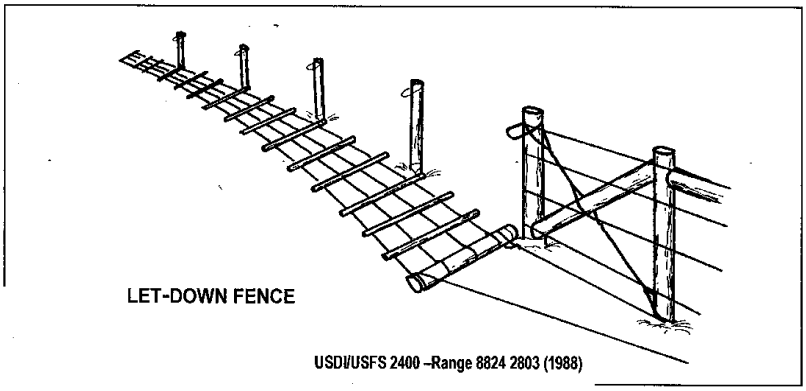


Inset C
Strain Insulator

LET-DOWN FENCES

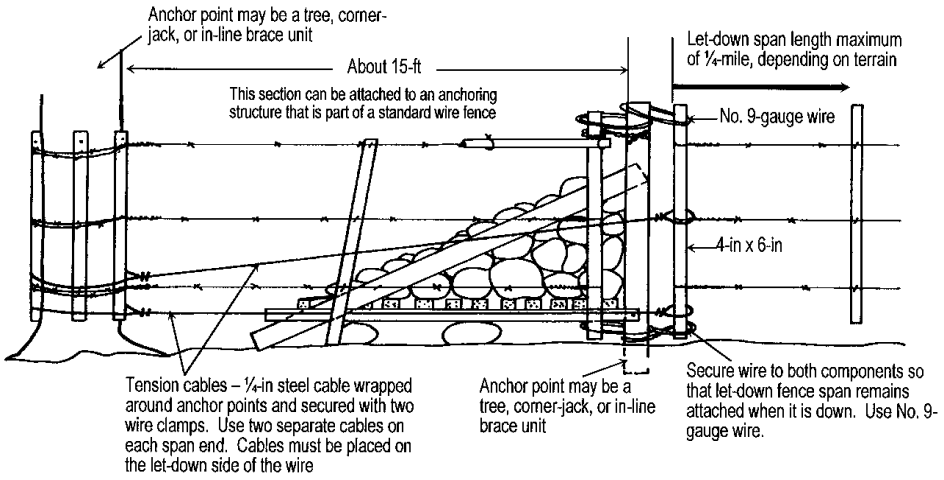
USDI/USFS 2400-Range 8824 2803 (1988)

EXHIBIT 2



LET-DOWN FENCE

USDI/USFS 2400 –Range 8824 2803 (1988)

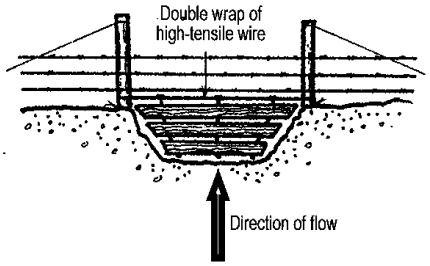


ANCHORING OF LET-DOWN FENCE

Sanderson et al (1990)

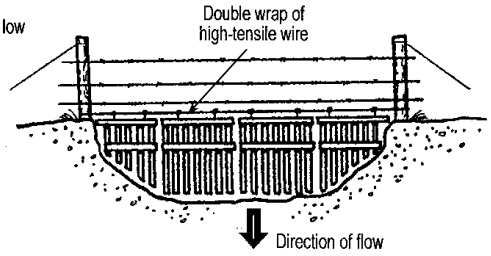
LET-DOWN FENCE

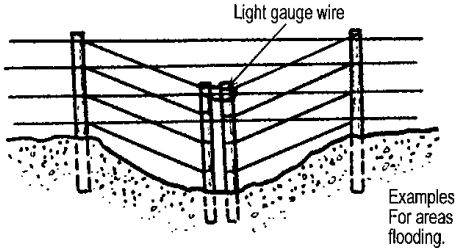
EXHIBIT 3



USDI/USFS 2300-Range 8824 2803 (1988)

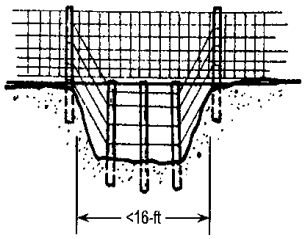
FLOOD GATES
For fence line crossing of low areas subject to flash floods.



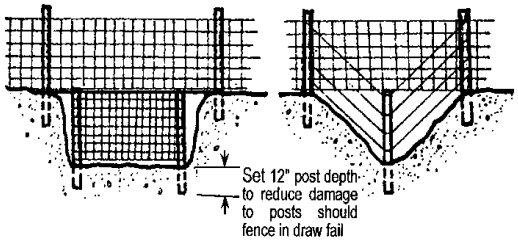


WATER GAPS
For control of livestock where fence lines cross streams or drainageways

Examples of "breakaway" type water gap fencing:
For areas with very little water and only occasional flooding.
Use flood gate type panels in areas with regular flooding.

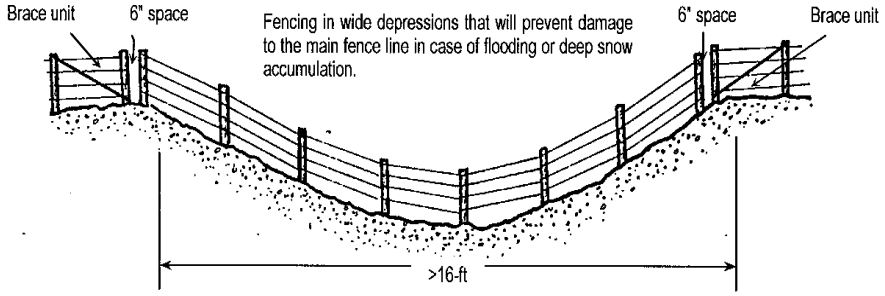


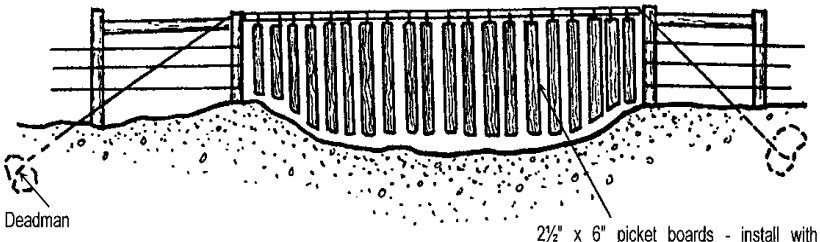
For depressions more than 16-ft wide, brace units need to be installed on either side of drainageway



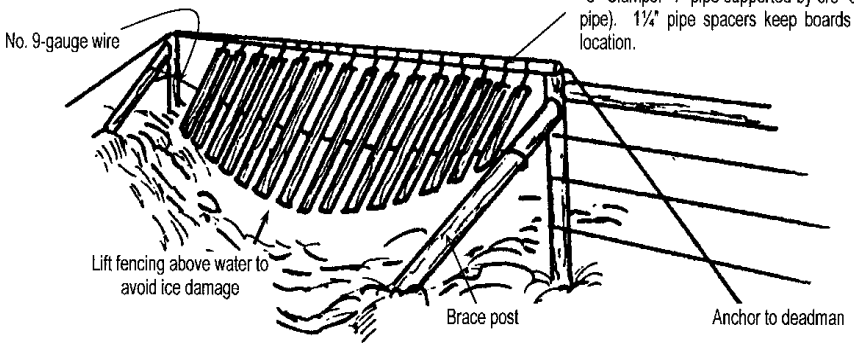
FLOOD GATES AND WATER GAPS

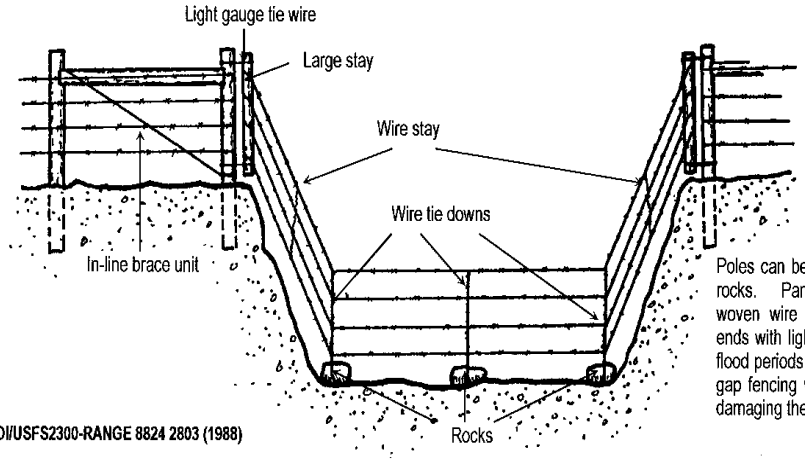
EXHIBIT 4





SWING FENCE



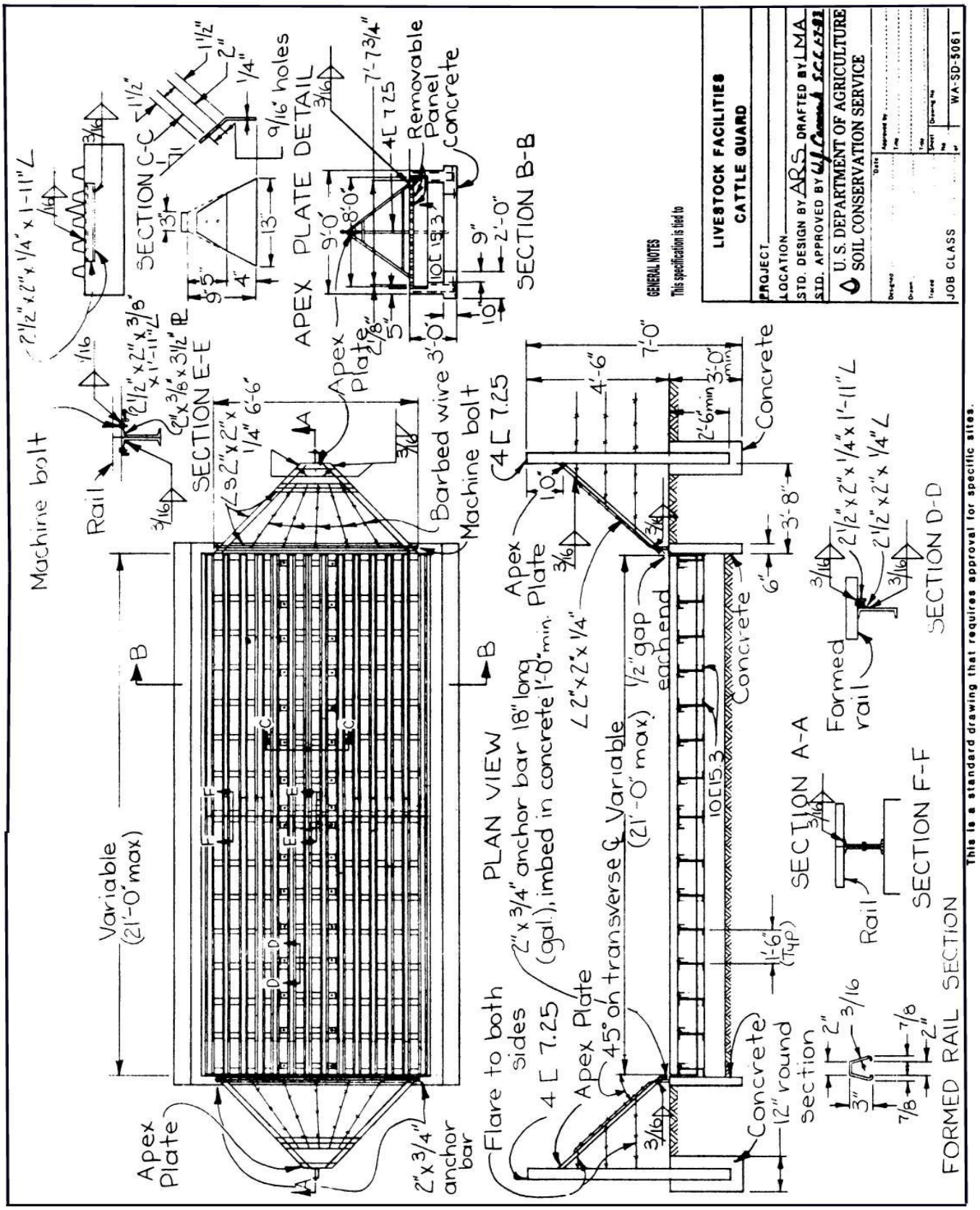


Poles can be used rather than large rocks. Panels can be made of woven wire or boards. Tie panel ends with light gauge wire so during flood periods one or both ends of the gap fencing will break loose without damaging the main fence line.

USDI/USFS2300-RANGE 8824 2803 (1988)

WATER GAPS

EXHIBIT 5


LIVESTOCK FACILITIES
CATTLE GUARD
PROJECT
LOCATION
STD. DESIGN BY ARS DRAFTED BY LMA
STD. APPROVED BY
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
JOB CLASS
WA-SD-5061
GENERAL NOTES
This specification is tied to
SECTION C-C
APEX PLATE DETAIL
SECTION B-B
SECTION E-E
PLAN VIEW
SECTION A-A
SECTION F-F
FORMED RAIL SECTION
Machine bolt
Rail
Variable (21'-0" max)
Apex Plate
Barbed wire
Removable Panel
Concrete
Flare to both sides
Formed rail
This is a standard drawing that requires approval for specific sites.